

Effect of 30 Minutes Walking on Decreasing Blood Sugar Levels in Diabetes Mellitus Patients Type 2 in Kwala Mencirim Village

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Abstract

Diabetes Mellitus is a global problem that occurs at this time Diabetes Mellitus sufferers are at risk of experiencing various complications if not properly controlled and can cause death. This study aimed to determine the effect of walking for 30 minutes on reducing blood sugar levels in Type 2 Diabetes Mellitus patients in Kwala Mencirim Village. This research is a type of quantitative research using a Quasi-experimental research design, with the One Group Pre-post Test Design research design. The research was conducted in Kwala Mencirim Village, Langkat Regency, North Sumatra Province. The time of this research was in May–August 2021. The population of this study were all Type 2 Diabetes Mellitus sufferers in Kwala Mencirim Village, totaling 80. The research sample was 10 patients with Type 2 Diabetes Mellitus. The sampling technique used Purposive Sampling. Data collection was carried out using observation sheets, blood sugar digital devices. Data analysis was performed by paired t-test with Wilcoxon. The results showed an effect of walking 30 minutes on reducing blood sugar levels in patients with Type 2 diabetes mellitus ($p=0.001 < \alpha\ 0.05$) in Kwala Mencirim Village, Langkat Regency, North Sumatra Province. With an average pretest blood sugar level of 220 mg/dl and a post-test of 212 mg/dl. It is recommended for Health Workers to be able to apply 30 minutes of walking therapy to reduce or stabilize Blood Sugar Levels in Type 2 Diabetes Mellitus patients and it is suggested to the public, especially people with Diabetes Mellitus, to more routinely do 30 minutes of walking therapy without drugs.

Keyword: Blood Sugar Levels, Type 2 Diabetes Patients, Walking

INTRODUCTION

Non-communicable diseases have become a public health problem that cannot be ignored. One of the non-communicable diseases that has received a lot of attention is diabetes mellitus. Diabetes is a disease whose number of sufferers is increasing yearly and in Indonesia is a serious threat to national health development (Yurida et al., 2019).

Diabetes Mellitus (DM) is a chronic disease in which the pancreas is unable to produce enough insulin or when the body cannot effectively use the insulin it produces, causing an increase in glucose concentration in the blood (hyperglycemia). Long-term hyperglycemia can cause microvascular complications (retinopathy, nephropathy, neuropathy) and macrovascular complications (Kementerian Kesehatan RI., 2020).

According to the International Diabetes Federation, 2021 reports that as many as 537 million people suffer from diabetes, which is projected to reach 643 million in 2030 and 783 million in 2045. In addition, 541 million people are estimated to have diabetes mellitus. It is also estimated that more than 6.7 million people aged 20–79 will die from diabetes-related causes in 2021. Based on IDF data for 2021, it is reported that the 10 countries with the highest number of diabetics in the population aged 20-79 years, first place is China (140 .9 million). Indonesia is ranked 5th out of 10 countries with the highest number of sufferers, namely 19.7 million. Indonesia is the only Southeast Asian country on the list, so it can be estimated that Indonesia's contribution to the prevalence of Diabetes cases in Southeast Asia (IDF, 2021).

Based on Basic Health Research data for 2018, the prevalence of Diabetes Mellitus sufferers in Indonesia is 2.0%. The prevalence of Diabetes Mellitus based on Doctor's Diagnosis in North Sumatra Province is 2.03% and the Prevalence of Diabetes Mellitus in Langkat Regency is 2.50% (Kemenkes RI, 2018).

Physical exercise has an important role in controlling blood sugar levels. This exercise can be started with exercise therapy or walking for 30 minutes as far as 2 km properly so that sufferers and their families can get maximum treatment (Rehmaitamalem et al., 2021).

According to American Collage of Sports Medicine (ACSM) Walking activity is a form of physical activity recommended every day. Suppose walking activities are carried out according to ACSM recommendations, such as going barefoot or only wearing very thin-soled shoes. In that case, this can help a person get out of an inactive lifestyle into an active one. (Tindaon, 2020).

Walking with a certain frequency can even reduce the risk of developing metabolic diseases such as Diabetes Mellitus, high cholesterol (dyslipidemia), hypertension and coronary heart disease. Walking activity will be effective and useful for health if done at least 30 minutes 5 (five) times a week (Fahrunnisa et al., 2019).

Walking is a physical activity that uses the muscles, especially the leg muscles, to move from one place or another. Managing DM sufferers can be done with daily physical activity and regular physical exercise 3 to 5 days a week for about 30 to 45 minutes. For 150 minutes per week with no more than 2 consecutive days between workouts. The recommended physical exercise is aerobic physical exercise, one of which is walking (Perkeni, 2021).

Walking is an easy and cheap way to be healthy, but to get maximum results for health it is very necessary to pay attention to the position of the feet when walking for 30-60 minutes with a distance of 2 km. Based on research Yitno et al., (2017), walking therapy has an effect on reducing blood sugar levels in patients with type 2 diabetes mellitus (p-value = 0.000). It's

the same with research Isrofah et al., (2017) states that there is an effect of walking 30 minutes on blood sugar values in patients with type II diabetes mellitus in Karangsari Village, Karanganyar District, Pekalongan Regency (p value = 0.018).

Based on research Rohmana et al., (2019) there was a significant difference between the treatment of aerobic physical activity walking 30 minutes daily compared to the treatment of aerobic physical activity walking 60 minutes 3 times a week. Community empowerment is needed in carrying out routine and regular walking 60 minutes 3 times a week because it is good as an effort to treat type 2 Diabetes Mellitus sufferers non-pharmacologically. Study Dahliana et al., (2021) states that walking exercise has an effect on reducing blood sugar levels in diabetes mellitus patients $p=0.001 < \alpha = 0.05$. Therefore, regular walking should be done to control sustainable blood sugar (Hati et al., 2022).

Diabetes management in controlling good blood glucose levels must apply 4 pillars: medical nutrition therapy, physical activity, pharmacological intervention, and education. One type of exercise recommended for diabetics is moderate-intensity aerobic exercise, which is 50-70% of the maximum heart rate (Colberg et al., 2010).

From the results of an initial survey conducted by researchers at the Pasar VI Village Supporting Community Health Service Center from the results of interviews conducted with 5 people with Type 2 Diabetes Mellitus, and they said they were still taking insulin medication, they did not know that walking for 30 minutes could reduce insulin resistance. blood sugar levels in patients with type 2 diabetes mellitus.

From the results of an interview that the author conducted with one of the employees at the Public Health Service Center related to Diabetes Mellitus, it turns out that there is no research on walking for 30 minutes can reduce blood sugar levels in Diabetes Mellitus patients at the Public Health Service Center in Kwala Mencirim Village, Langkat Regency. So, based on this background and problem, the researcher aims to conduct research with the title "The effect of walking for 30 minutes on reducing blood sugar levels in patients with type 2 Diabetes Mellitus in Kwala Mencirim Village, Langkat Regency in 2021”.

METHODS

This research is a type of quantitative research using a Quasi-experimental research design, with the One Group Pre-post Test Design research design. This design seeks to uncover causal relationships in groups by comparing the pre-test and post-test results (Rukminingsih et al., 2020). This study aimed to determine the effect of walking for 30 minutes on reducing blood sugar levels in patients with type 2 Diabetes Mellitus in Kwala Mencirim Village, Langkat Regency in 2021.

This research was conducted in Kwala Mencirim Village, Langkat Regency, North Sumatra Province. The time of this research was in May–August 2021. The population of this study was all Type 2 Diabetes Mellitus sufferers in Kwala Mencirim Village, totaling 80 consisting of 30 women and 50 men. The sample in this study were 10 Type 2 Diabetes Mellitus patients in Kwala Mencirim Village. Gymnastics is carried out for each respondent, namely for 30 minutes for 1 week 3 times with a duration of 30 minutes and a distance of 2 km.

The sampling technique uses purposive sampling, which selects samples based on inclusion and exclusion criteria. The inclusion criteria in this study were willing to be respondents, type 2 diabetes mellitus sufferers who did not experience complications from other diseases, type 2 diabetes mellitus sufferers who did not take blood sugar lowering drugs. While the exclusion criteria in this study were type 2 Diabetes Mellitus sufferers who experienced joint problems or were unable to walk and withdrew during the walking exercise.

In this study, data were collected on physical exercise, 30 minutes of light walking, using an observation sheet to find out the data by checking blood sugar levels, using the Glucotest before and after doing 30 minutes of light walking.

After collecting data, data analysis was carried out to determine the effect of walking for 30 minutes on reducing blood sugar levels. Data analysis was carried out using a computerized program Statistic Package for Social Science (SPSS) version 22 to test the differences in blood sugar levels in patients with type 2 diabetes mellitus before and after the 30-minute walking intervention. The variables to be tested consist of numerical variables, so the data analysis in this study was bivariate analysis using the Wilcoxon paired sample T test with a confidence level of 0.05.

RESULTS

The frequency distribution of the characteristics of the respondents in this study can be seen in Table 1. as follows:

Table 1. Frequency Distribution and Blood Sugar Levels of Respondents

Demographic Data	Frequency	%
Age		
30-50	6	60,0
51-70	4	40,0
Gender		
Male	6	60,0
Female	4	40,0
Work		
Entrepreneur	5	50,0
Indonesian National Army	1	10,0
Doesn't work	4	40,0
Education		
Elementary School	4	40,0
Junior High School	2	20,0
Senior High School	4	20,0
Weight		
40-60 Kg	4	40,0
61-80 Kg	6	50,0

Table 1 shows that the average age of respondents between 30-50 years is 6 (60.0%) people, predominately suffering from Type 2 Diabetes Mellitus with male sex as many as 6 (60.0%) people. Occupations that are dominant with type 2 Diabetes Mellitus are those who work as entrepreneurs as many as 5 (50.0%) and besides that the number of respondents who do not work also experience Type 2 Diabetes Mellitus as many as 4 (40.0%) people due to activities that lack movement and more sleep. The highest level of education of respondents in Kwala Mencirim Village is high school graduation, namely 4 people (20.0%), junior high school, 2 people (20.0%) and the lowest education level is elementary school, namely 4 people (40.0%) and the highest weight for Diabetes Mellitus sufferers is 61-80 kg, namely 6 people (50.0%) and 4 people (40.0%) weighing 40-60.

The frequency distribution of blood sugar levels before being given a 30-minute walk to reducing blood sugar levels in diabetic patients in Kwala Mencirim Village, Langkat Regency in 2021, can be seen in Table 2. below:

Table 2. Frequency distribution of blood sugar levels before being given a 30-minute walk

Blood Sugar Levels	Frequency	%	Mean Blood Sugar Levels
<200 mg/dl	2	20,0	220 mg/dl
>200 mg/dl	8	80,0	
Total	**10**	**100**	

From Table. 2 it can be seen that before the 30-minute walking intervention was carried out, blood sugar levels were measured in Diabetes Mellitus patients first and the average was taken from 10 respondents before walking that the average respondent's blood sugar level was around 220 mg/dl.

The frequency distribution of blood sugar levels after being given a 30-minute walk to reduce blood sugar levels in diabetic patients in Kwala Mencirim Village, Langkat Regency in 2021, can be seen in Table 3 below:

Table 3. Frequency distribution of blood sugar levels after being given a 30-minute walk

Blood Sugar Levels	Frequency	%	Mean Blood Sugar Levels
<200 mg/dl	2	20,0	
>200 mg/dl	8	80,0	212 mg/dl
Total	**10**	**100**	

From Table 3 above, it can be seen that after the intervention was carried out walking for 30 minutes for 1 week 3 times with a duration of 30 minutes and a distance of 2 km in the same respondents with control and fairly strict observation, it was found that the blood sugar levels of the respondents after walking were around 212 mg /dl. There were 8 patients with blood sugar levels > 200 mg/dl because the respondents had been diagnosed with Type 2 Diabetes Mellitus which resulted in it being difficult for the patient's blood sugar levels to reach a normal value of <200 mg/dl, but this can be seen from the patient's blood sugar level before therapy. the average ranged from 220 mg/dl and after therapy became 212 mg/dl there was a decrease in blood sugar levels in the average respondent who was given a walking intervention for 30 minutes.

The effect of walking 30 minutes on reducing blood sugar levels of diabetic patients in Kwala Mencirim Village, Langkat Regency in 2021, can be seen in Table 4. below:

Table 4. The Effect of a 30-Minute Walk on Lowering Blood Sugar Levels

Blood Sugar Levels	Mean	Standard deviation	Deviation	P-value
Pre Test Blood Sugar Levels	220,00	24,651	8	0,001
Post Test Blood Sugar Levels	212,00	28,513		

Based on Table 4. The results showed that the average blood sugar level before the 30-minute walking intervention was 220 mg/dl and the average blood sugar level after the 30-minute walking intervention was 212 mg/dl. this shows a difference of 8% in blood sugar levels before and after being given a 30-minute walking intervention. The results of the Wilcoxon Test obtained a p-value of 0.001 <α 0.05, which means that there is an effect of walking 30 minutes on reducing blood sugar levels in patients with Type 2 diabetes mellitus in Kwala Mencirim Village, Langkat Regency, North Sumatra Province.

DISCUSSION

The Effect of a 30-Minute Walk on Blood Sugar Levels in Kwala Mencirim Village, Langkat Regency in 2021

From the research data conducted by researchers on 10 respondents. The average blood sugar level before the 30 minute walking intervention with a mean of 220 and the mean value after the intervention was 212 can be seen from the mean value there was only a decrease of 8% which should have occurred above 10%, it can be concluded that there are several factors that inhibit a decrease in sugar levels significantly, that is caused by less duration, less long distances, ideally people with Diabetes Mellitus have to walk 5 km per day with a p-value of 0.001 because the p-value is (0.001 <0.005) therefore it can be concluded that there is an influence walk 30 minutes to reduce blood sugar levels in patients with type 2 Diabetes Mellitus in Kwala Mencirim Village, Langkat Regency 2021.

The results of this study are in line with research Yitno et al., (2017) that there is an effect of walking therapy on reducing blood sugar levels in patients with type 2 diabetes mellitus (p-value = 0.000). It's the same with research Isrofah et al., (2017) states that there is an effect of walking 30 minutes on blood sugar values in patients with type II diabetes mellitus in Karangsari Village, Karanganyar District, Pekalongan Regency (p value = 0,018).
Research Rehmaita et al., (2017) states that there is an effect of diabetes exercise and walking on reducing blood sugar levels in patients with Type 2 Diabetes Mellitus at the Krueng Barona Jaya Public Health Service Center, Aceh Besar (p-value=0,002). This proves that physical exercise such as gymnastics, jogging, cycling or jogging can reduce glucose levels in the body so that it greatly affects the decrease in glucose levels for people with type II diabetes mellitus (Sofa et al., 2021).

Research conducted by Pratiwi et al., (2021) states that there is an effect of physical activity walking on reducing blood sugar levels in patients with Type 2 diabetes mellitus in Padang City (p-value = 0.000). Walking intervention is important in controlling blood glucose levels in patients with diabetes mellitus. The effect of the walking intervention is to increase insulin sensitivity so that blood glucose levels in patients can be suppressed (Permana et al., 2021).

The better diabetes exercise is done, the better the healing rate of diabetes, characterized by a decrease in blood glucose when finished carrying out activities in the form of diabetes exercise. will affect the cure of diabetes (Hamzah et al., 2018).

Physiologically, walking can increase the use of glucose by muscles compared to hepatic glucose release during physical exercise. Even though blood glucose decreased significantly, the blood glucose level was still higher than normal, so no DM sufferer experienced hypoglycemia. In other words, it can be concluded that even acute physical exercise can reduce blood glucose in patients with Type II Diabetes Mellitus (Fauzi, 2014). Regularity in physical activity has the greatest influence on the success of treating diabetes mellitus. Regular physical exercise is an important part of managing diabetes mellitus in everyday life which can maintain body weight, normal blood pressure, help improve insulin function in the body and improve psychological health (Kasana et al., 2019).

Based on research that has been conducted in Kwala Mencirim Village, Langkat Regency in 2021, it was found that the blood sugar levels of the respondents before walking 30 minutes, on average, the blood sugar levels of the respondents tended to be high, eating patterns, activities, and psychology were the triggers for an increase in blood sugar levels in patients with Diabetes Mellitus. This diet contains a lot of sugar and activities that are rarely carried out because people with Diabetes Mellitus feel weak when doing activities that cause blood glucose to fail to be managed into energy, resulting in a buildup of blood sugar levels in the blood.

Respondents aged 30 years, glucose levels rise 1-2mg/dl% during fasting and will increase 6-13mg/dl% 2 hours after eating. From this, it can be concluded that the age factor can trigger or aggravate Diabetes Mellitus. In addition to age, it greatly influences research when giving 30 minutes of walking therapy because too old age causes the elderly to tire easily and must be given 15 minutes of rest before continuing therapy until they meet the requirements set by the researcher.

Based on the gender factor, there was an increase in blood sugar levels, from the demographic data of the majority of respondents who were male, due to the lifestyle and association of men who were mostly carried out outside the home and consumed excessive sugar, were not controlled and rarely went to see a doctor or health services to check their health, and the gender factor also affected when giving walking therapy to female respondents who complained more because they had done a lot of homework before giving therapy, moreover it was affected by a decrease in the hormone estrogen which affected body balance and caused some respondents to tire quickly.

Based on the occupational factors, the respondents who experienced the most diabetes were working as entrepreneurs because they only worked at home and only looked after their stalls, causing their lifestyle to be sedentary and causing glucose in the blood not to be

processed into energy and causing a buildup of blood sugar levels the same as in Respondents who did not work increased blood sugar levels caused by sedentary habits and eating patterns that were not maintained or controlled.

Based on the weight factor itself, it can cause obesity Diabetes Mellitus, namely overweight ≥ 20% of ideal body weight. Obesity causes a reduction in the number of insulin receptors that can work from cells in skeletal muscle and fat tissue and obesity also damages beta cells to release insulin when there is an increase in blood glucose, meaning that respondents who have *BMI (body massa index)* abnormally affects the slow decline in blood sugar levels because obesity can cause a reduction in the number of insulin receptors.

Diabetes Mellitus is a disease that cannot be cured but blood sugar levels can be controlled. Behaviors to control blood sugar levels include doing physical activity, adhering to the Diabetes Mellitus diet, managing Diabetes Mellitus therapy, and adhering to diabetes control (Juwita et al., 2018).

Walking has an important role in regulating blood glucose levels. At the same time, the benefits of physical activity such as walking for people with diabetes mellitus can control blood glucose levels, prevent obesity in blood lipids and increase blood pressure. (Damayanti, 2015). Increased sensitivity of muscle insulin receptors and increased muscle insulin receptors during physical exercise. In physical exercise, blood flow will increase, causing more capillary nets to open so that more insulin receptors are available and the receptors become more active. This decrease in blood sugar levels is also related to an increase in the number and sensitivity of insulin receptors on cell membranes, so there is a 100% decrease in insulin requirements in people with Type II Diabetes Mellitus (Amelia et al., 2018).

Walking can burn calories; the more calories burned, the lower blood sugar levels. When the respondent walks, the heart rate will increase and breathing becomes more difficult. Muscles in the body will certainly need more glucose in the blood to lower blood sugar levels and make insulin in the body work better.

CONCLUSIONS

Based on the results of research that has been conducted by researchers regarding the effect of a 30-minute walk on reducing blood sugar levels in type 2 Diabetes Mellitus patients in Kwala Mencirim Village, Langkat Regency 2021, it can be concluded that :

1. The average blood sugar level before the 30-minute walking intervention was 220 mg/dl and the average blood sugar level after the 30-minute walking intervention was 212 mg/dl

2. There is an effect of walking 30 minutes on reducing blood sugar levels in patients with Type 2 diabetes mellitus with a value (p-value = 0.001) in Kwala Mencirim Village, Langkat Regency, North Sumatra Province. The average blood sugar level before the 30-minute walking intervention was 220 mg/dl, and the average after the 30-minute walking intervention was 212 mg/dl.

It is recommended for health workers to become a motivator and provide intensive counseling for people with diabetes mellitus to do routine diabetes exercises to lower blood sugar levels and prevent complications of diabetes mellitus. It is recommended for people diagnosed with type 2 Diabetes Mellitus to be able to use an alternative to walking as a habit to lower and stabilize blood sugar levels without drugs.

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